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The Role of Corsican Orography in a Localized Heavy Precipitation Event

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Despite the progress in forecasting mesoscale phenomena during the recent years, the distribution and intensity of heavy convective precipitation still pose a serious challenge to models and forecasters alike. The difficulties are even greater in the presence of complex orography and in maritime regions, where upstream conditions are not well known due to a lack of observations over the sea. Both of these conditions apply to the island of Corsica.

In order to study the influence of an orographic obstacle on air flows and precipitation, we present a detailed case study of a localized heavy precipitation event of October 23 2012. The analysis is supported by observations, which were made during SOP 1 of the HyMeX (Hydrological Cycle of the Mediterranean, http://www.hymex.org/) project and in the frame of the CORSiCA observatory (http://www.obs-mip.fr/corsica). In addition, we present high resolution simulations of the event done with the Meso-NH model, to explore the capability of the model to capture the complex interaction between large scale flows and local phenomena such as flow splitting, orographic lift, and convective cells. The role of certain orographic features is tested by means of sensitivity tests with modified terrain.

The localized character of the event of October 23 makes it an ideal candidate to investigate the interaction between multiple scales. While the large scale forcing was provided by a cut-off low around 60 km northeast of Menorca, the damage on Corsica was restricted to only a few towns in the south, where serious flooding occurred.

Using simulation results and observations, we show that the event of 23 October 2012 was the result of flow splitting around Corsica interacting with the large scale mid and upper level wind. While the flow splitting supported convergence over the south of the island and was responsible for the stationarity of the convective system, the individual cells moved along with the mid and upper level winds. Using sensitivity tests we show that the orography of Corsica was a determining factor in the placement and stationarity of this heavy precipitation event.